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Stop “Droning” on about Unmanned Aircraft Systems and Do Something About It

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ENGINEERING AND OPERATIONS MANAGEMENT LUNCH & LEARN WEBINAR SERIES

October 25, 2018

ONLINE DEGREE OPTIONS

<i>Expand breadth and depth of engineering knowledge</i>	<i>Provide leadership and business skills to manage technology teams</i>	<i>Improve effectiveness and efficiency of operations</i>
M.S. in Engineering	M.S. in Engineering Management	M.S. in Operations Management
MSE Comprehensive Exam	MSEM Comprehensive Exam	MSOM Comprehensive Exam
3 Electives chosen from MSEM, OMGT, and Engineering courses	3 Electives chosen from MSEM, OMGT, and Engineering courses	6 Electives chosen from OMGT and MSEM courses
4 core courses from approved list Computer Applications Mathematics Management Technical Communications	4 core courses EMGT 5033 Intro to Engineering Mgt OMGT 5783 Project Management OMGT 5463 Economic Decision Making INEG/OMGT 5443 Decision Models	4 core courses OMGT 5003 Intro to Operations Mgt OMGT 5123 Finance or 5463 Economic Decision Making OMGT 5623 Strategic Management OMGT 5783 Project Management
Approved 3 course engineering sequence to form cohesive topic area	Approved 3 course engineering sequence	Undergraduate Prereqs (if required) OMGT 4853 Decision Support Tools OMGT 4323 Industrial Cost Analysis OMGT 4333 Statistics OMGT 4313 Law and Ethics
ABET Accredited Bachelors Degree in Engineering		Any Regionally Accredited Bachelors Degree

TODAY'S PRESENTER



Dr. Richard Ham

- Associate Director – M.S. in Operations Management and M.S. in Engineering Management Programs
- Transportation executive with 37 years of experience
- Retired from USAF and Homeland Security, where he held various regional and national leadership roles
- Teaches Leadership, Global Competition, Homeland Security, and UAS courses

STOP "DRONING" ON ABOUT UNMANNED AIRCRAFT SYSTEMS AND DO SOMETHING ABOUT IT

(P.S. Your Competitors are Ahead of You)

University of Arkansas
Dr. Richard Ham
Department of Industrial Engineering
Associate Director
Master of Science in Operations Management
Master of Science in Engineering Management

OVERVIEW

- Background
 - Focus on Unmanned Systems BUT Land and Maritime are Emerging
- Current Uses
- Emerging Use
 - Supply Chain, Yard Management, Optimization
- Compliance Issues and Skills Required

BACKGROUND

The operational capabilities of the V-1 and its ability to carry a large weapon across international borders unmanned is likely the impetus for the inclusion of the following statement in the initial charter of the International Civil Aviation Organization's Chicago Convention of 1944: "No aircraft capable of being flown without a pilot shall be flown without a pilot over the territory of a contracting State without special authorization by that State and in accordance with the terms of such authorization. Each contracting State undertakes to insure that the flight of such aircraft without a pilot in regions open to civil aircraft shall be so controlled as to obviate danger to civil aircraft." Convention on International Civil Aviation, Art. 8. Chicago, 1944

- Marshall, Douglas M. *Introduction to Unmanned Aircraft Systems, Second Edition, 2nd Edition*. CRC Press, 20160616. VitalBook file.

BACKGROUND

- In the United States:
 - Section 336 as authority
 - 14 CFR 101
 - 14 CFR 107
 - Public Exemptions
 - Section 333
 - Authority for Administrator to Waive

BACKGROUND (OBSTACLES?)

- Unmanned aircraft must weigh less than 55 pounds, including payload, at takeoff
- Fly in Class G airspace*
- Keep the unmanned aircraft within visual line-of-sight*
- Fly at or below 400 feet*
- Fly during daylight or civil twilight*
- Fly at or under 100 mph*
- Yield right of way to manned aircraft*
- Do not fly directly over people*
- Do not fly directly over people* (The term "over" refers to the flight of the small unmanned aircraft directly over any part of a person.)

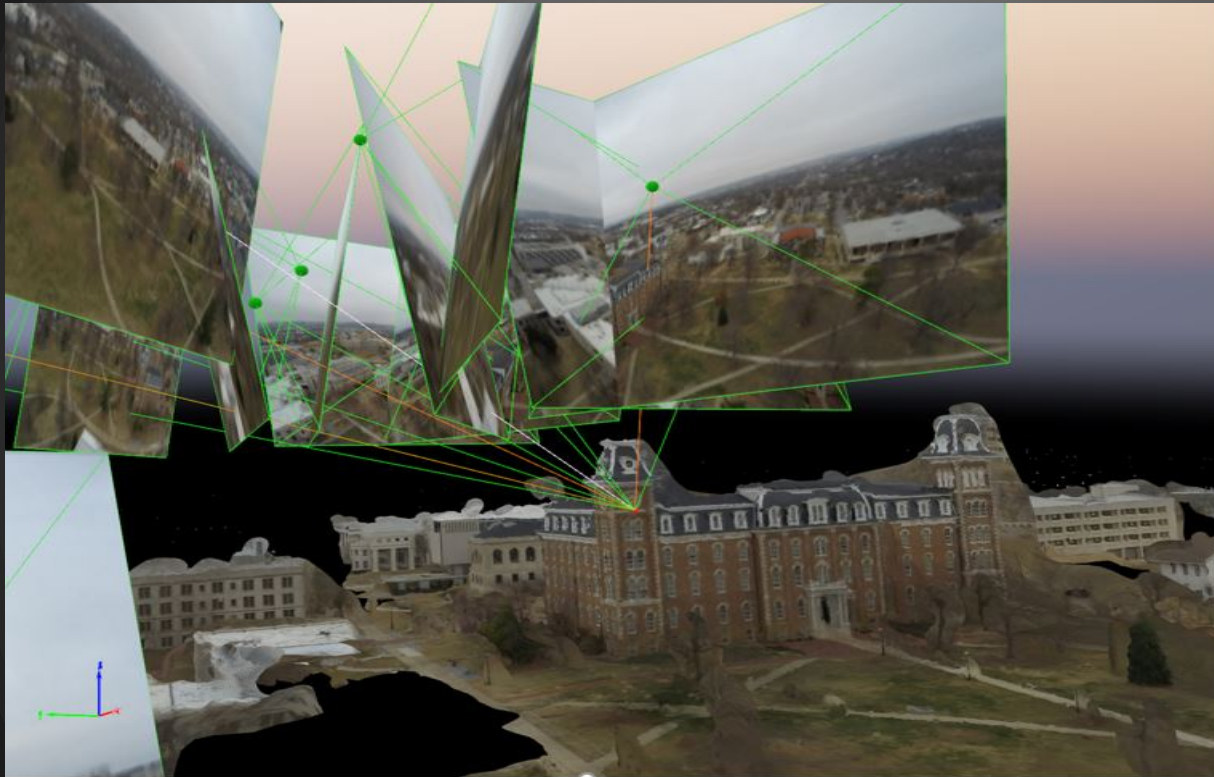
BACKGROUND

- Changing Definition of Multimodal Supply Chain
- Market Demand Driving Change
 - Two Day Delivery Considered Minimum Standard
 - Same Day Delivery Already Emerging
 - Same Hour Delivery Developing
- Includes Air, Land, Sea in 3 Dimensions

CURRENT USES

- Law Enforcement
 - Investigation
 - Tactical
- Search and Rescue
- Communications Relay
- Atmosphere, Meteorology
- HAZMAT, Radioactive Detection
- *Entry Level Supply Chain*

CURRENT USES



CURRENT USES



EMERGING USES



EMERGING USES



MIT:

"Between 2003 and 2011, the U.S. Army lost track of \$5.8 billion of supplies among its warehouses," says Fadel Adib, the Sony Corporation Career Development Assistant Professor of Media Arts and Sciences, whose group at the MIT Media Lab developed the new system. "In 2016, the U.S. National Retail Federation reported that shrinkage — loss of items in retail stores — averaged around \$45.2 billion annually. By enabling drones to find and localize items and equipment, this research will provide a fundamental technological advancement for solving these problems."

EMERGING USES - VIDEOS

Yard Management

- 1) <https://youtu.be/RNkMIUzRsYM>

EMERGING USES - VIDEOS

Delivery

2) <https://youtu.be/vNySOrl2Ny8>

EMERGING USES - VIDEOS

Supply Chain Optimization

3) <https://youtu.be/P5hQHBNpd7s>

EMERGING USES - VIDEOS

Inventory Management

4) <https://youtu.be/FY5U7eySew4>

COMPLIANCE ISSUES AND SKILLS REQUIRED

- Certification
 - 107
 - Certificate of Authorization
 - 333
- Airspace
 - Class B, D and E
 - Near Airport
- Operations
 - Night and Over People

COMPLIANCE ISSUES AND SKILLS REQUIRED

FAA

- Eliminated much of 336
 - Similar to 107 Testing
- Emphasizes Universal Traffic Management
 - BVLOS and EVLOS
 - DELIVERY BY UAS
 - Automatic Exemptions
- Test Sites and Education Programs

COMPLIANCE ISSUES AND SKILLS REQUIRED

**Navigable Airspace for Drones:
Private Property Rights and Regulated Airspace**

United States v. Causby, 328 U.S. 256 (1946)

Griggs v. County of Allegheny (1962)

Lingle v. Chevron (2005)

COMPLIANCE ISSUES AND SKILLS REQUIRED

- Cyber Security
 - Anti-Hacking
- New Modeling Skills
 - Supply Chain, Inventory Management
 - Use of Software

ONLINE PROGRAM OPTIONS

M.S. IN OPERATIONS MANAGEMENT

- Online and Live Course Options
- 30 Credit Hours (10 Graduate Courses)
 - With up to 4 pre-requisite classes
- 8-week Sessions Per Year
- No GRE/GMAT required with 3.0 Bachelor's GPA
- Total Program Cost is \$12,000 to \$15,000 (depending on pre-reqs needed)
- Can be completed in one year, but you have up to six years to complete

GRADUATE CERTIFICATE IN PROJECT MANAGEMENT

- Online and Live Course Options
- 12 Credit Hours (4 Graduate Courses)
- 8-week sessions
- Five Enrollment Periods: Aug, Oct, Jan, Mar, May
- Entire Program Cost: Approximately \$5,000
- 2.5 GPA with a Bachelor's Degree required for admission
- Certificate courses can also count toward MSOM degree